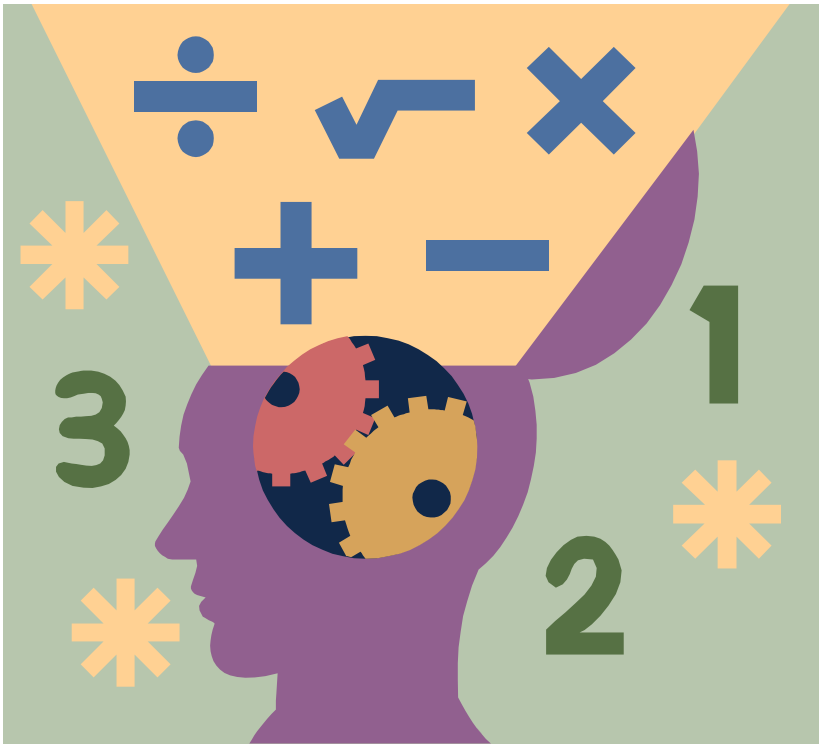
Math
Curriculum Guide



Approved by the
Board of Education
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Littleton Public Schools
5776 S. Crocker St.
Littleton, CO 80120

Mathematics Curriculum Revision and Materials Selection Committees

The mathematics curriculum went through a lengthy process in order to develop the revised curriculum and select materials to support the instruction and learning of the essential learnings. The following timeline represents this process:

2002-2003: K-12 Math Research Team

2003-2004: K-12 Math Investigations Team

2004-2005: K-12 Philosophical Assumptions Committee

2004-2005: K-12 Curriculum Writing and Materials Selection Committee

Philosophical Assumptions Committee

Barb Burcham	Wilder Elementary
Marcia Miller	Lenski Elementary
Debbie Snemyr	East Elementary
Cathy Baker	Newton Middle School
Lynn Duran	Euclid Middle School
Mary Habas	Arapahoe High School
Sandy Lepore	Goddard Middle School
Kathy Potter	Euclid Middle School
Tina Baca	Heritage High School
Betsy Lhotta	Arapahoe High School
Don Zolla	Littleton High School
Susan Dalton	Facilitator/Curriculum Coordinator
Patti Turner	Facilitator/Assessment Coordinator
Mollie McDonald	Director of Curriculum and Assessment

Curriculum Writing and Materials Selection Committee

Tina Baca	Heritage High School
Krista Bretz	Arapahoe High School
Lynn Duran	Euclid Middle School
Barb Herman	Wilder Elementary
Kathy Kennedy-Tuchfeld	Highland Elementary
Sandy Lepore	Goddard Middle School
Ian Malcolm	Pathways
Gerald Maness	Powell Middle School
Patty Meagher	Newton Middle School
Marcia Miller	Lenski Elementary
Linnea Nelson	Centennial Fine Arts Academy
Linda Pearlman	Lenski Elementary
Kathy Potter	Euclid Middle School
Melissa Radulovich	Franklin Elementary
Chelsea Rogers	Powell Middle School
Abbie Wade	Heritage High School
Don Zolla	Littleton High School
Jean Martinez	Administrative Liaison
October Minnotte	Administrative Liaison
Debbie Snemyr	Elementary Math Resource Specialist
Ann Summers	Secondary Math Resource Specialist
Susan Dalton	Curriculum Coordinator
Mollie McDonald	Director of Curriculum, Instruction, & Assessment

Mathematics
Philosophical Assumptions

Mathematics is a coherent and useful discipline used to develop problem-solving skills and make real life applications.* "All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding." * The essential components of the Littleton Public Schools mathematics curriculum are taught through research-based instructional practices.

Components of the Littleton Public Schools comprehensive mathematics curriculum include:

- Number sense/relationships (*State Standard 1*)
- Algebraic methods (*State Standard 2*)
- Data Collection and Analysis, Statistics and Probability (*State Standard 3*)
- Geometric Concepts (*State Standard 4*)
- Measurement (*State Standard 5*)
- Computational Techniques (*State Standard 6*)

The Littleton Public Schools comprehensive mathematics curriculum integrates process standards.

Students will:

- become mathematical problem solvers (*Colorado Student of Mathematics goal 1*)
- learn to communicate mathematically (*Colorado Student of Mathematics goal 2*)
- learn to reason mathematically (*Colorado Student of Mathematics goal 3*)
- make mathematical connections (*Colorado Student of Mathematics goal 4*)
- become confident of their mathematical abilities (*Colorado Student of Mathematics goal 5)*
- learn the value of mathematics (*Colorado Student of Mathematics goal 6*)
- use multiple representations (analytic, numerical, graphical, and verbal) of mathematical phenomena to develop models and solve problems.**

*NCTM *Principles and Standards for School Mathematics*, pg 5

**NCTM *Principles and Standard for School Mathematics: An Overview*, pg 14

Math Curriculum
Essential Learnings K-5

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Number Sense/Relationships	Demonstrate meaning of numbers and number relationships by describing and using whole numbers ~~to 30~~.	Demonstrate meaning of whole numbers and number relationships by describing and using whole numbers to 100.	Demonstrate meaning of number and number relationships by describing and using whole numbers through 1,000 and commonly used fractions.	Describe and analyze whole numbers and number relationships to 10,000 including commonly used fractions.	Demonstrate meaning through reading and writing for whole numbers, commonly used fractions and decimals, and their respective place values from 0-100,000.	Identify and analyze characteristics of commonly used decimals, fractions, percents, and whole numbers to 1,000,000.
Algebraic Methods	Demonstrate the ability to explore, model and describe patterns in a variety of ways.	Create, describe and represent patterns in a variety of ways and communicate reasoning.	Identify, extend, and describe patterns in number and geometric shapes using symbols, words, and numbers.	Recognize and describe patterns, and use tables, graphs and open sentences to solve problems, while communicating reasoning.	Recognize and describe patterns, and use tables, graphs and open sentences to solve problems, while communicating reasoning.	Explore, model and explain patterns and functions in problem-solving situations using algebraic methods and justify reasoning.
Data Collection and Analysis, Statistics and Probability	Select, organize and describe data.	Collect, record, represent and describe data in problem-solving situations and make mathematical connections.	Collect, record, represent, interpret data and communicate reasoning.	Make predictions, and solve a problem by collecting, recording, representing, and interpreting data (including tables, charts, and graphs).	Solve problems using various strategies for interpreting data.	Solve problems by collecting, representing and analyzing data, statistics and probability and justify reasoning.

Math Curriculum
Essential Learnings K-5

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Geometric Concepts	Recognize, name and describe the relationships of two-dimensional shapes.	Describe and compare characteristics of two- and three-dimensional shapes.	Identify and analyze two- and three-dimensional shapes and describe their relationship using appropriate math vocabulary.	Identify, draw, compare, classify, and build physical models of two- and three-dimensional models of geometric figures and describe their relationships using appropriate math vocabulary.	Compare, classify, and construct geometric figures and analyze their relationships.	Identify, construct, describe, analyze and apply geometric concepts and properties to solve problems and justify reasoning.
Measurement	Measure, describe and compare the relationships between objects using a variety of non-standard units.	Incorporate the use of estimation and comparison for standard and non-standard measurement.	Describe, estimate, and use customary units to measure, compare, and order.	Select and use appropriate customary metric units of measurement to estimate and describe length, time, and money.	Select and use the appropriate customary and metric units of measure for familiar objects to develop a sense of measurement and solve problems.	Determine the appropriate unit (customary or metric) to estimate or measure using a variety of tools and techniques and justify reasoning.
Computational Techniques	Understand the concepts of addition and subtraction.	Generate multiple strategies to model and explain addition and subtraction problems.	Generate and use multiple strategies to model and explain addition and subtraction in problem-solving situations.	Use multiple strategies to demonstrate and explain the four basic operations of whole numbers in problem-solving and real-life situations.	Construct and/or select, use, and explain methods of computing and/or estimating whole numbers in problem-solving situations (using mental math, paper and pencil, calculator, and other forms of technology).	Develop, demonstrate, and describe multiple strategies and techniques for estimation and computation of whole numbers, fractions, decimals, percents and integers.

Math Curriculum
Essential Learnings 6-10

	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Number Sense/Relationships	Demonstrate meaning of relationships by identifying, expressing, and ordering fractions, decimals, and percents. Develop, test, and explain conjectures about rational numbers.	Demonstrate meaning of relationships by identifying, expressing, and ordering fractions, decimals, percents, and integers. Develop, test, and explain conjectures involving ratio and proportion.	Demonstrate an understanding of properties of real numbers. Develop, test, and explain conjectures to estimate and justify the reasonableness of solutions involving real numbers.	Utilize real numbers in problem solving situations. Develop and test patterns and conjectures about the real number properties.	Utilize real numbers in problem solving situations. Develop and test patterns and conjectures about the properties of real numbers.
Algebraic Methods	Analyze and utilize linear relationships in problem-solving situations.	Solve two-step linear equations in problem-solving situations. Represent, describe, and analyze geometric and numeric patterns using algebraic notation.	Analyze functional relationships and convert from one functional relationship to another; analyze geometric and numeric patterns using algebraic notation.	Model real world situations using expressions, functions, equations, inequalities, and linear systems Develop, use, and describe the connections between multiple representations of relations and functions (verbal, graphical, numerical, and algebraic). Analyze and explain transformations and general properties of functions algebraically and geometrically. Analyze rates of change in various contexts and approximate and interpret rates of change from graphical and numerical data.	Model real world situations using functions, equations, inequalities, systems and matrices. Develop, use, and describe the connections between multiple representations of relations and functions (verbal, graphical, table, numerical, and symbolic). Analyze and explain transformations and general properties of functions algebraically and geometrically. Analyze rates of change in various context and approximate and interpret rates of change from graphical and numerical data.

Math Curriculum
Essential Learnings 6-10

	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Data Collection and Analysis, Statistics and Probability	Use data collection and statistical analysis in problem-solving situations and communicate the reasoning. Make predictions based on data obtained from simple probability experiments.	Use data collection and statistical analysis in problem-solving situations and communicate the reasoning. Make predictions and compare results using both experimental and theoretical probability.	Use data collection and statistical analysis in problem-solving situations and communicate the reasoning. Make predictions using theoretical probability of compound events in real-world problems.	Design and conduct a statistical experiment and interpret and communicate the results using the appropriate technology Fit curves to scatter plots, determine the strength of the relationship between two data sets, and make predictions. Use experimental and theoretical probability to represent and solve real-world problems involving uncertainty.	Design and conduct a statistical experiment and interpret and communicate the results using the appropriate technology. Fit curves to scatter plots, determine the strength of the relationship between two data sets, and make predictions. Use experimental and theoretical probability to represent and solve real world problems involving uncertainty
Geometric Concepts	Communicate understanding and reasoning of geometric concepts, properties and relationships in problem-solving situations.	Communicate understanding and reasoning of geometric concepts, properties and relationships in problem-solving situations.	Communicate understanding and reasoning of geometric concepts, properties and relationships in problem-solving situations.	Analyze relationships among properties of geometric figures. Derive and apply methods of measurement that explore properties of two- and three-dimensional figures. Explore properties and measurements of triangles.	Analyze relationships among and properties of geometric figures. Derive and apply methods of measurement that explore properties of two- and three- dimensional figures. Explore properties and measurements of triangles.

Math Curriculum
Essential Learnings 6-10

	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Measurement	Use formulas and/or procedures to solve problems involving measurement. Estimate, determine, and use direct and indirect measurements to describe and make comparisons. Describe how a change in an object's linear dimension affects its perimeter and area.	Use formulas and/or procedures to solve problems involving measurement. Determine, and use direct and indirect measurements to describe and make comparisons. Describe how a change in an object's linear dimension affects its perimeter and area.	Use formulas and/or procedures to solve problems involving measurement. Estimate, determine, and use direct and indirect measurements to describe and make comparisons. Describe how a change in an object's linear dimension affects its surface, area, and volume.	Select and apply appropriate tools and techniques to measure quantities in order to achieve specific degrees of precision, accuracy, and error. Solve problems involving measurement using algebraic and geometric techniques.	Select and apply appropriate tools and techniques to measure quantities in order to achieve degrees of precision, accuracy, and error. Solve problems using algebraic, geometric, and trigonometric techniques.
Computational Techniques	Develop and use appropriate computational techniques for use in problem-solving situations.	Develop and use appropriate computational techniques for use in problem-solving situations.	Apply appropriate computational techniques for use in problem-solving situations.		

KINDERGARTEN

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate meaning of numbers and number relationships by describing and using whole numbers.

Learner Objectives

The learner will . . .

- describe relationships between two sets of quantities using the terms: more, less, greater than, less than, more than, fewer than, and equal to 30
- read and write numerals in meaningful context to 30
- sort and name: penny, nickel, dime, and quarter
- use concrete materials to demonstrate one to one correspondence
- use concrete materials to identify ordinal numbers with 0-10 objects
- count forward verbally from any given number 0-50
- count backward verbally 30-0
- estimate a reasonable quantity for a given number of objects to 30
- subitize (*recognize instantly*) regular dot patterns and finger patterns to 10
- describe the concept of zero
- count with understanding and recognize “how many” in sets of objects

KINDERGARTEN
Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate the ability to explore, model and describe patterns in a variety of ways.

Learner Objectives

The learner will . . .

- identify, describe, extend, and create a pattern
- use a variety of methods to interpret a pattern's sequence (*i.e. physical actions or concrete materials*)

KINDERGARTEN

Data Collection and Analysis, Statistics and Probability

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Select, organize and describe data.

Learner Objectives

The learner will . . .

- contribute data to a graph
- read and explain a graph using the following terms: more, fewer, most, same, fewest
- sort objects by various attributes (*i.e. color, shape, size, texture, etc.)*

KINDERGARTEN

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Recognize, name and describe the relationships of two dimensional shapes.

Learner Objectives

The learner will . . .

- recognize and name circle, square, rectangle, oval, and triangle
- identify two-dimensional shapes, circle, square, rectangle, oval, and triangle in the environment
- indicate position of objects using the following terms: left/right, top/bottom, first/next/last, between
- use geometric shapes to solve a problem (*match shapes, sort shapes, create simple design*)

KINDERGARTEN

Measurement

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Measure, describe and compare the relationships between objects using a variety of non-standard units.

Learner Objectives

The learner will . . .

- measure and verbally compare objects using non standard units
- explain attributes of objects using the concepts of long/short, heavy/light, big/little, small/large, and same
- tell time orally to the nearest hour using an analog and digital clock
- compare and order objects according to length and weight
- recite sequentially the days of the week

KINDERGARTEN

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Understand the concept of addition and subtraction.

Learner Objectives

The learner will . . .

- show with manipulatives and describe verbally joining two sets of objects under 10 (parts to whole)
- show with manipulatives and describe verbally separating two sets of objects under 10 (whole to parts)

FIRST GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate meaning of whole numbers and number relationships by describing and using whole numbers to 100.

Learner Objectives

The learner will . . .

- compare numbers using more than, less than, between, and ordinals
- represent, explain, compare, and decompose* numbers through 100 including place value
- use 10 as an important landmark* in the number system
- demonstrate counting by 1's, 2's, 5's, and 10's forwards and backwards from any number using a number line and/or grid to locate and place numbers
- identify, sequence, read, and write numbers through 100
- demonstrate the value of pennies, nickels, dimes, quarters, and dollars (*i.e. 25 pennies = 1 quarter, 4 quarters = 1 dollar*)
- differentiate between 1/2's, 1/4's, understanding that a whole is divided into equal parts
- use numbers to solve real life problems and make estimations
- calculate the value of combinations of pennies, nickels, and dimes
- know fact families
- know odd and even numbers to 10
- identify complements of 10

FIRST GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Create, describe and represent patterns in a variety of ways and communicate reasoning.

Learner Objectives

The learner will . . .

- identify, describe, and sequence patterns using a number grid and attributes
- represent, create, and extend a pattern in a variety of ways (i.e. physical actions, concrete materials, drawings, and numbers)
- continue the pattern given in a table of data
- write and solve number sentences involving addition and subtraction using missing addends and subtrahends in pictorial and numeral form

FIRST GRADE

Data Collection and Analysis, Statistics and Probability

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Collect, record, represent and describe data in problem-solving situations and make mathematical connections.

Learner Objectives

The learner will . . .

- collect, categorize, and describe data using surveys, tables, charts, pictographs, tally marks and bar graphs
- complete a bar graph using collected data
- interpret data using the concepts of more, fewer, most, same, and fewest
- generate, analyze, and make predictions based on data obtained from chance devices (coins, spinners, dice)

FIRST GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Describe and compare characteristics of two- and three-dimensional shapes.

Learner Objectives

The learner will . . .

- identify and create the characteristics of two- and three- dimensional shapes including open and closed figures, circles, ovals, rectangles, triangles, squares, cubes, spheres, and cylinders
- recognize the relationship of congruence among two-dimensional shapes

FIRST GRADE

Measurement

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Incorporate the use of estimation and comparison for standard and non-standard measurement.

Learner Objectives

The learner will . . .

- predict, organize, measure, and compare temperature, and length of objects using standard and non standard units with words, numbers, materials and pictures
- estimate and use measures of time to the hour and the half hour using an analog and digital clock
- recite sequentially the months of the year

FIRST GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Generate multiple strategies to model and explain addition and subtraction problems.

Learner Objectives

The learner will . . .

- use non linguistic* representations to show addition of sums to 10 and subtraction with minuends through 10
- demonstrate automatic recall and record addition and subtraction facts to 10
- solve one step addition and subtraction word problems without extraneous information

SECOND GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate meanings of numbers and number relationships by describing and using whole numbers through 1,000 and commonly used fractions.

Learner Objectives

The learner will . . .

- model and explain the value of whole numbers including ordinal positions for first through thirty-first using concrete materials
- identify, recognize, sequence, and write numbers in meaningful contexts
- apply equalities and inequalities using symbols for greater than, less than, equal to
- count and group in various ways such as count on, count back, count by 10's and 100's on and off the decade
- demonstrate understanding of odd and even
- read, write, sequence, compare, and identify place value of numbers to 1,000
- demonstrate knowledge of coins by communicating name, value, equivalencies, and combinations up to $1.00
- use numbers to solve real life problems and make estimations to determine reasonableness
- add $ combinations of $1, $5, $10, $20
- generate equivalent representations for the same number up to three digits including expanded notation
- model and explain the relationships of 1/2, 1/3, 1/4 to the whole

SECOND GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Identify, extend, and describe patterns in numbers and geometric shapes using symbols, words, and numbers

Learner Objectives

The learner will . . .

- find missing elements of a repeating pattern
- verbally describe patterns in tables and graphs and use information to solve problems
- use concrete or pictorial patterns to determine how the change in one variable affects the change in another (i.e. the change in the number of hands changes the number of fingers)
- write simple number models to solve problems and communicate reasoning

SECOND GRADE

Data Collection and Analysis, Statistics and Probability

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Collect, record, represent, interpret data and communicate reasoning.

Learner Objectives

The learner will . . .

- collect, sort, and classify data to solve real life problems
- record and represent data using a variety of models such as tallies, bar graphs, pictographs, or tables
- describe and interpret data
- generate, analyze, and make predictions based on data obtained from surveys and chance devices
- demonstrate understanding of probability outcomes such as; impossible, certain, likely, and not likely
- concretely determine the possible combinations of matching a set containing two elements with a different set containing two elements

SECOND GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Identify and analyze two and three dimensional shapes and describe their relationship using appropriate math vocabulary

Learner Objectives

The learner will . . .

- understand appropriate names and attributes of shapes
- identify and reproduce congruent shapes
- describe, identify, and pictorially illustrate symmetry
- concretely solve problems using geometric relationships and spatial reasoning such as forming shapes with pattern blocks or geo boards
- demonstrate understanding of parallel/non-parallel line segments

SECOND GRADE

Measurement

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Describe, estimate, and use customary units to measure, compare, and order.

Learner Objectives

The learner will . . .

- estimate, compare, and measure the length of objects to the nearest half inch, foot, and yard
- estimate, compare, and measure the capacity of a container in cups and gallons
- tell time to the nearest 5 minutes, using an analog and digital clock
- measure temperature to the nearest 2° and 10° F
- know the number of hours in a day, inches in a foot, feet in a yard, and quarts in a gallon
- select and use appropriate standard and non standard units of measurement in problem-solving situations

SECOND GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Generate and use multiple strategies to model and explain addition and subtraction in problem-solving situations.

Learner Objectives

The learner will . . .

- use a variety of materials, manipulatives, pictures, number lines and grids, and calculations to develop strategies for addition and subtraction of two-digit numbers
- demonstrate fluency with addition and subtraction facts to 18 mentally and in writing
- demonstrate understanding of the inverse relationship of addition and subtraction with concrete materials
- use concrete materials to demonstrate understanding of multiplication and division
- solve real life world problems by choosing the correct operation and communicate reasoning

THIRD GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Describe and analyze whole numbers and number relationships to 10,000 including commonly used fractions.

Learner Objectives

The learner will . . .

- read, write, sequence, compare, and identify place value of numbers to 10,000 including expanded notation
- generate equivalent representations for the same number up to four digits
- solve addition and subtraction problems using commutative and associative properties (6+2+3=3+6+2)
- locate, label, and count forward from any number by 2's, 10's, and 100's up to 1,000
- model and explain the relationships of 1/3, 1/6, 1/8, and 1/10, to a whole and a set
- locate and label halves on a number line
- identify properties of numbers, including commonly used fractions and decimals (0.5, 1/2, 3/4. 0.75) using pictorial representation
- apply an appropriate strategy to formulate different combinations of currency for a set amount up to $10.00

THIRD GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Recognize and describe patterns, and use tables, graphs and open sentences to solve problems, while communicating reasoning.

Learner Objectives

The learner will . . .

- use a pattern to find missing elements (i.e. multiples of 2, 3, 4, 5, 10)
- describe patterns and other relationships using tables, graphs and open sentences (4 + _ = 7)
- recognize when a pattern exists and use that information to solve a problem, including frames and arrows diagrams and function machines
- observe and explain how a change in one quantity can produce a change in another (i.e. the relationship between the number of bicycles and the number of wheels)

THIRD GRADE

Data Collection and Analysis, Statistics and Probability

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Make predictions, and solve a problem by collecting, recording, representing, and interpreting data, including tables, charts, and graphs.

Learner Objectives

The learner will . . .

- interpret data using the concepts of minimum, maximum, mode, and range
- use various displays of data to make interpretations and draw conclusions
- determine which outcomes are most likely, least likely, and equally likely when using a chance device (i.e. a spinner) and communicate fairness
- use pictures to determine all combinations of matching a set containing two elements with a set containing three elements (i.e. find the number of outfits that can be made from two blouses and three skirts)

THIRD GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Identify, draw, compare, classify, and build physical models of two and three dimensional models of geometric figures and describe their relationships using appropriate math vocabulary.

Learner Objectives

The learner will . . .

- create a figure with at least one line of symmetry
- define the characteristics of two-dimensional figures, such as, right angles, parallel sides, number of sides, and vertices
- identify points, lines, line segments and rays
- create and identify the results of combining or subdividing geometric shapes (i.e. tanagrams and pattern blocks)
- solve problems using geometric relationships and spatial reasoning (using rectangular coordinates to locate objects, constructing models of three-dimensional objects)
- recognize and identify three-dimensional figures with regard to vertices, edges, and faces
- understand/differentiate the terms perimeter and area

THIRD GRADE

Measurement

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Select and use appropriate customary and metric units of measurement to estimate and describe length, time, and money.

Learner Objectives

The learner will . . .

- use an analog and digital clock to tell time to the nearest minute including AM and PM
- compare objects according to the measurable attributes of length, capacity weight, or temperature
- measure the length of objects including the sides of rectangles and squares to the nearest 1/2 inch and centimeter
- read, interpret, compare and order pictorial representation of measurements of length, weight, temperature, and capacity (i.e. pictures of rulers, thermometers, etc.)
- choose the appropriate tool to measure familiar objects and situations including length weight, temperature, and time
- establish familiar objects as referents for measurement of length (i.e. a paper clip is about one inch) and use to estimate length
- determine elapsed time to nearest hour

THIRD GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Use multiple strategies to demonstrate and explain the four basic operations of whole numbers in problem-solving and real-life situations.

Learner Objectives

The learner will . . .

- use pictures, diagrams, numbers, and words to demonstrate addition and subtraction of whole numbers up to four-digit numbers (including regrouping, partial sums, trade first)
- demonstrate addition and subtraction of proper fractions with common denominators of 10 or less using pictures
- use estimation strategies with whole numbers prior to performing operations of addition and subtraction to determine reasonableness of solutions to problems
- use addition, subtraction, or multiplication in a real world problem solving situation
- determine from real world problems whether an estimated or exact sum, difference, or product is reasonable and acceptable
- show automatic recall and fluency of multiplication facts of 0 to 5 and 10
- solve division problems using objects

FOURTH GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate meaning through reading and writing for whole numbers, commonly used fractions and decimals, and their respective place values from 0-100,000.

Learner Objectives

The learner will . . .

- use concrete materials and/or picture representations to compare and order fractions with like and unlike denominators, such as halves, thirds, fourths, eighths, and tenths
- use concrete materials and/or picture representations to visually demonstrate the decimal fractions of tenths and hundredths
- formulate, sequence, and compare numbers and number words for selected quantities from zero to 1,000,000
- generate equivalent representations and expanded notation for whole numbers up to 1,000,000 (i.e. 56 can be represented as 50+6, 100-44, LVI, 112/2, 7x8; 5693 can be represented as 5000+600+90+3 or 5 thousands, 6 hundreds, 9 tens, and 5 ones)
- apply an appropriate strategy to formulate different combinations of currency for a set amount up to $10.00
- create a number line, locating and labeling halves, multiples of fourths and thirds between whole numbers
- show division of whole numbers is not commutative (1-digit into 2-digits)
- use and apply number properties with any of the four basic operations
- employ estimation strategies in any of the four basic operations to determine reasonableness of solutions, including problems with money

FOURTH GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Recognize and describe patterns, and use tables, graphs and open sentences to solve problems, while communicating reasoning.

Learner Objectives

The learner will . . .

- reproduce, extend, create, and describe patterns such as in common fractions, geometric shapes, measurement, addition, subtraction, multiplication, and division facts
- identify missing elements of a complex repeating pattern (example: 1, 2, 3, 5,_,13)
- display numbers in tables or graphs to show patterns; describe patterns given in tables and graphs
- formulate and employ a rule using addition, subtraction, or multiplication and create and/or solve problems using the applied rule
- analyze how the change in one variable affects the change in the other by addition, subtraction, multiplication
- use pictures to describe all possible combinations of matching the elements of two sets
- solve problems using parentheses

FOURTH GRADE

Data Collection and Analysis, Statistics and Probability

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Solve problems using various strategies for interpreting data.

Learner Objectives

The learner will . . .

- collect, organize, construct, comprehend, and interpret a table, line plot, bar graph, and/or pictograph from given data (selection of appropriate type of graph, use of graph paper, use of horizontal/vertical axis)
- gather and use various displays of data, formulate questions, interpret, and draw conclusions
- incorporate and present survey data to make and justify real-world decisions
- construct and deconstruct data outcomes (most likely, least likely, or equally likely) from flipping a coin, spinning a spinner with 4 congruent sectors, and/or other chance devices
- comprehend and analyze the median, mode, and range of the minimum and the maximum element in a set of data
- given pictures, create all possible combinations of matching the elements of two sets (organized list)
- use 0 and common fractions to represent the possibility of events

FOURTH GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems*

Essential Learning

Compare, classify, and construct geometric figures and analyze their relationships.

Learner Objectives

The learner will . . .

- display all possibilities of similarity, symmetry, and congruence using standard polygons
- use nonlinguistic representation to demonstrate parallel, perpendicular, and intersecting lines
- relate a right angle to a measure of 90 degrees
- transfer coordinate pairs onto a quadrant graph to construct visual information
- identify, classify, and compare two dimensional shapes and use vocabulary to describe the attributes (ex: number of sides, vertices, angles, parallel sides)
- identify rays, lines, and line segments
- identify geometric solids
- identify acute, obtuse, reflex, and right angles
- transform geometric figures using reflections, translations, and rotations to explore congruence

FOURTH GRADE

Measurement

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Select and use the appropriate customary and metric units of measure for familiar objects to develop a sense of measurement and solve problems.

Learner Objectives

The learner will . . .

- fluently identify time in hours and minutes, using both analog and digital displays
- select and use the appropriate tool to measure and compare familiar objects in situations that contain length, weight, capacity, time, and temperature in US customary and/or metric units
- construct and measure perimeter/area of polygons to the nearest half inch or centimeter (including using a grid)
- visually demonstrate and present the conversion of measurement/time units to smaller or larger units (ex. yard/feet/inches, hours/minutes/seconds, gallon/quart/cup, etc.)
- apply reasonable units of measurement to determine length, area, volume, capacity, weight, and temperature in US customary and/or metric units
- determine elapsed time to the nearest minute

FOURTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Construct and/or select, use, and explain methods of computing and/or estimating whole numbers in problem-solving situations (using mental math, paper and pencil, calculator, and other forms of technology)

Learner Objectives

The learner will . . .

- explain in writing or pictures addition, subtraction, multiplication, and division of whole numbers
- generate division problems demonstrating division as repeated subtraction
- demonstrate addition and subtraction of proper fractions with common denominators of twelve or less using concrete materials and picture representations
- add and subtract decimals where sums and differences should not exceed $100.00 using money notation (including making change)
- demonstrate and apply fluent understanding of basic multiplication and division facts through 100
- prepare a multiplication facts table to locate all the factors for a particular product (i.e. a product of six: 1,6, 2, and 3 are all factors)
- establish and use estimation strategies to determine the reasonableness of solutions involving the four operations
- use paper and pencil to demonstrate the four basic operations of whole numbers including
    - multiplication of up to 3-digits by 2-digits with regrouping
    - division of up to a 4-digit dividend by a 2-digit divisor
- approach a real world problem solving situation: present, develop and use appropriate strategies to define the problem, solve it, and explain the execution process
- identify a real world problem and analyze whether an estimated or exact sum, difference, product, or quotient is acceptable

FIFTH GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Identify and analyze characteristics of commonly used decimals, fractions, percents, and whole numbers to 1,000,000.

Learner Objectives

The learner will . . .

- identify factors, multiples, prime, and composite numbers to 100
- describe numbers to a million by their characteristics (even, odd)
- recognize equivalent representations for same number and generate them by construction and deconstruction numbers
- develop, test, and explain conjectures (a statement expressing an opinion based on incomplete evidence) about properties of whole numbers and commonly used fractions and decimals, such as 1/2, 1/3, 1/4, 1/8, 1/10
- use number properties (commutative, identity, associative) to evaluate numeric expressions and solve equation
- demonstrate the meaning of square numbers using pictorial or concrete materials
- use appropriate techniques to estimate, determine and justify the reasonableness of solutions to problems involving whole numbers
- apply strategies to make change up to $20.00
- demonstrate and explain the relationships between fractions, decimals, and percents

FIFTH GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Explore, model and explain patterns and functions in problem-solving situations using algebraic methods and justify reasoning.

Learner Objectives

The learner will . . .

- recognize that a variable is used to represent an unknown quantity
- match a description of a situation with a continuous graph
- use tables, charts, concrete objects, or pictures to solve problems involving linear relationships and whole numbers

FIFTH GRADE

Data Collection and Analysis, Statistics and Probability

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Solve problems by collecting, representing and analyzing data, statistics and probability and justify reasoning.

Learner Objectives

The learner will . . .

- organize, construct and interpret displays of data including tables, charts, line plots, bar graphs, line graphs
- choose the correct graph to represent a given scenario
- read, interpret and draw conclusions from various displays of data
- describe how data sample size affects the nature of the data set
- use zero and common fractions to represent the possibility of events
- make predictions based on data obtained from a simple probability experiment
- solve problems using strategies for finding all possible combinations and/or arrangements
- determine mean/average

FIFTH GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Identify, construct, describe, analyze and apply geometric concepts and properties to solve problems and justify reasoning.

Learner Objectives

The learner will . . .

- read coordinate pairs in quadrant one in a coordinate graph
- determine the coordinate graph that represents a given set of data
- solve problems involving perimeter of polygons
- predict and describe the results of flipping, sliding and turning a two-dimensional shape
- solve problems involving area of rectangles and squares

FIFTH GRADE

Measurement

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Determine the appropriate unit (customary or metric) to estimate or measure using a variety of tools and techniques and justify reasoning.

Learner Objectives

The learner will . . .

- determine appropriate unit of measurement (customary or metric) when estimating distance, capacity, and weight
- estimate the measure of angles such as 90 degrees, less than 90 degrees, and more than 90 degrees
- read and interpret scales on number lines, graphs, and maps
- select appropriate unit and tool to accurately measure a particular problem
- measure the sides of rectangles, squares, and triangles to nearest 1/4 inch and nearest centimeter
- estimate and use standard and/or metric units for length, weight, and temperature

FIFTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop, demonstrate and describe multiple strategies and techniques for estimation and computation of whole numbers, fractions, decimals, percents and integers.

Learner Objectives

The learner will . . .

- apply and explain strategies to add, subtract, multiply, and divide whole numbers in problem solving situations
- demonstrate proficiency of addition, subtraction, multiplication, and division of whole numbers in problem solving situations
- determine and justify verbally and in writing whether information given in a problem solving situation is sufficient, insufficient or extraneous using accurate computation
- create and illustrate a real world problem given a math sentence using one of four operations with whole numbers
- construct concrete materials or pictures to determine commonly used percentages such as 25%, 50%, in a problem solving situation
- use and explain strategies to add and subtract commonly used fractions with like denominator in problem solving situations
- use and explain strategies to add and subtract commonly used decimals in problem solving situations

SIXTH GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate meaning of relationships by identifying, expressing, and ordering fractions, decimals, and percents.

Learner Objectives

The learner will . . .

- locate commonly used positive rational numbers* including terminating decimals through hundredths, fractions (1/2, 1/3, 1/4, 1/8, and 1/10), mixed numbers, and percents on a number line
- demonstrate meaning and equivalence using models
- write remainders as decimals and fractions
- demonstrate equivalence relationships among fractions, decimals and percents in problem-solving situations* (for example, two students out of eight is the same as 25%)
- use number sense* to estimate, determine, and justify the reasonableness of solutions involving whole numbers, decimals, and common fractions (only sums and differences for fractions and decimals) (i.e. is 1/2 + 1/3 closer to 0, 1/2 or 1)

SIXTH GRADE

Number Sense/Relationships 2

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop, test, and explain conjectures involving rational numbers.

Learner Objectives

The learner will . . .

- identify and use the concepts of factor, multiple, prime*, composite, and square* numbers
- describe numbers by characteristics (divisibility, even, odd, prime*, composite, square*)
- use number sense* to estimate, determine, and justify the reasonableness of solutions involving whole numbers, decimals, and common fractions (only sums and differences for fractions and decimals) (example: Is 1/2 + 1/3 closer to 0, 1/2 or 1?)

SIXTH GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze and utilize linear relationships in problem-solving situations.

Learner Objectives

The learner will . . .

- represent, describe, and analyze geometric and numeric patterns* using tables, words, symbols, concrete objects, or pictures
- use a variable* to represent an unknown (letter, box, symbol)
- solve problems by representing and analyzing patterns* using tables, words, concrete objects, or pictures

SIXTH GRADE

Data Collection and Analysis, Statistics and Probability 1

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Use data collection and statistical analysis in problem-solving situations and communicate the reasoning.

Learner Objectives

The learner will . . .

- interpret and draw conclusions (predict) from line graphs, bar graphs, circle graphs and frequency tables
- gather and organize data with an appropriate graphical representation
  - line graph
  - bar graph
  - line plot
  - frequency table
  - tables
- find and use measures of central tendency*
- find and use the range to find an appropriate scale for a given set of data

SIXTH GRADE

Data Collection and Analysis, Statistics and Probability 2

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Make predictions based on data obtained from simple probability experiments.

Learner Objectives

The learner will . . .

- become acquainted with probability informally through experiments
- make predictions based on data obtained from simple probability* experiments
- describe an event as likely or unlikely and explain the degree of likelihood using words such as certain, very likely, not likely, or impossible
- determine the number of possible outcomes for simple events

SIXTH GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Communicate understanding and reasoning of geometric concepts, properties and relationships in problem-solving situations.

Learner Objectives

The learner will . . .

- identify, compare, and analyze the attributes of two- dimensional shapes
- utilize vocabulary to describe the attributes of acute, obtuse, right angle, parallel lines, perpendicular lines, intersecting lines, and line segments
- plot points on a coordinate graph in quadrant 1
- identify congruent* shapes using reflections*and rotations*
- show lines of symmetry* on a two-dimensional figure

SIXTH GRADE

Measurement 1

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Use formulas and/or procedures to solve problems involving measurement.

Learner Objectives

The learner will . . .

- solve problems involving the perimeter of polygons
- solve problems involving area of polygons (square, rectangle, parallelogram, rhombus, triangle)
- use formulas and/or procedures to solve problems involving the perimeter of a polygon
- use formulas and/or procedures to solve problems involving the area of squares, rectangles, parallelograms, rhombus, and triangles

SIXTH GRADE

Measurement 2

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Estimate, determine, and use direct and indirect measurements to describe and make comparisons.

Learner Objectives

The learner will . . .

- read and interpret scales on number lines and graphs
- estimate the area of a polygon
- select the appropriate scale for a given problem (for example, use the appropriate scale when setting up a graph or determining the order of numbers on a number line)
- estimate angle measurements and the area of irregular shapes

SIXTH GRADE

Measurement 3

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Describe how a change in an object's linear dimension affects its perimeter and area.

Learner Objectives

The learner will . . .

- demonstrate how changing one of the dimensions of a rectangle or triangle affects the shape's perimeter and area using concrete materials or graph paper

SIXTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers in problem-solving situations* and communicate the reasoning used in solving these problems.*

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Essential Learning

Develop and use appropriate computational techniques for use in problem-solving situations.

Learner Objectives

The learner will . . .

- demonstrate proficiency with adding, subtracting, multiplying, and dividing with like and unlike denominators including mixed numbers
- demonstrate proficiency adding and subtracting decimals

SEVENTH GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate meaning of relationships by identifying, expressing, and ordering fractions, decimals, percents, and integers.

Learner Objectives

The learner will . . .

- use exponents* to indicate how many times a base is used as a factor for positive integers
- locate positive rational numbers* and integers on a number line
- read, write, order and compare positive rational numbers* and integers
- use the relationships among fractions, decimals and percents, including the concepts of ratio and proportion, in problem-solving situations* and use models* to represent integers

SEVENTH GRADE

Number Sense/Relationships 2

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop, test, and explain conjectures involving ratio and proportion.

Learner Objectives

The learner will . . .

- estimate, solve and justify the reasonableness of solutions to problems involving positive rational numbers* or integers
- formulate and solve proportions that arise in applications
- develop, test, and explain conjectures* about properties of numbers (associative, commutative, identity, distributive, multiplicative property of zero on whole and rational numbers*)

SEVENTH GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Solve two-step linear equations in problem-solving situations.

Learner Objectives

The learner will . . .

- translate written words to one step algebraic expressions/equations and conversely, one step algebraic expressions/equations to words
- solve problems by representing and analyzing patterns* involving positive real numbers* using tables, graphs, or rules

SEVENTH GRADE

Algebraic Methods 2

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Represent, describe, and analyze geometric and numeric patterns using algebraic notation.

Learner Objectives

The learner will . . .

- represent, describe, and analyze numeric or geometric patterns* involving common real numbers* using tables, graphs, rules, or symbols
- predict and describe how a change in one quantity results in a change in another quantity in a linear relationship
- explain whether data presented in a chart or graph is changing at a constant rate
- solve problems using tables, concrete objects, or pictures involving linear relationships with whole numbers

SEVENTH GRADE

Data Collection and Analysis, Statistics and Probability 1

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Use data collection and statistical analysis in problem-solving situations and communicate the reasoning.

Learner Objectives

The learner will . . .

- analyze a graph, table or summary for misleading characteristics
- construct a histogram or stem and leaf plot from a set of given data
- given a display of data (for example, line plot, stem and leaf plot, list of data), determine the mean, mode, median and range
- read, interpret, predict, and draw conclusions based on histograms, circle graphs, and stem and leaf plots

SEVENTH GRADE

Data Collection and Analysis, Statistics and Probability 2

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Make predictions and compare results using both experimental and theoretical probability.

Learner Objectives

The learner will . . .

- report the probability* of an event in fraction, decimal and percent form
- determine the probability* of simple independent and compound events (for example, tossing a coin and rolling a die)
- make predictions based on theoretical and experimental probability*
- determine the number of possible outcomes from a given event using a variety of strategies, such as: tree diagrams or organized lists

SEVENTH GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Communicate understanding and reasoning of geometric concepts, properties and relationships in problem-solving situations.

Learner Objectives

The learner will . . .

- describe and analyze the attributes of two- and three-dimensional shapes (for example, angles, sides, edges, faces, vertices)
- identify and compare similar shapes using ratio, proportion, or scale factor
- construct a coordinate graph and plot ordered integer* pairs in all four quadrants
- solve problems involving the surface area of rectangular prisms (formulas not provided)
- use reflections*, translations*, and/or rotations*, to determine congruence* between figures

SEVENTH GRADE

Measurement 1

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Use formulas and/or procedures to solve problems involving measurement.

Learner Objectives

The learner will . . .

- develop and use procedures or formulas to solve problems involving area of polygons (for example, trapezoids, regular hexagons, regular octagons)
- select and use appropriate units and tools to measure to the degree of accuracy required in a particular problem solving situation* (for example, reconstruct a replica of a given figure)

SEVENTH GRADE

Measurement 2

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Determine, and use direct and indirect measurements to describe and make comparisons.

Learner Objectives

The learner will . . .

- determine the area of irregular shapes
- estimate, make and use direct and indirect measurements to describe and make comparisons (for example, use a proportion to find the height of a flag pole)

SEVENTH GRADE

Measurement 3

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Describe how a change in an object's linear dimension affects its perimeter and area.

Learner Objectives

The learner will . . .

- describe how a change in an object's linear dimensions affects its perimeter and area (example, how a change in the radius or diameter will affect the circumference and area of a circle)
- learn the effect of scale factor on length ratios and area ratios

SEVENTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop and use appropriate computational techniques for use in problem-solving situations.

Learner Objectives

The learner will . . .

- apply order of operations (including exponents* with positive rational numbers*)
- explain why an estimate may be acceptable in place of an exact answer
- add, subtract, multiply, and divide positive rational numbers* and integers
- multiply and divide by powers of ten
- use models* to explain how ratios, proportions, and percents can be used to solve real-world problems*

EIGHTH GRADE

Number Sense/Relationships

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Demonstrate an understanding of properties of real numbers.

Learner Objectives

The learner will . . .

- recognize and use equivalent representations of positive rational numbers*
- compare and order sets of real numbers*
- develop and test conjectures* about properties of real numbers*
- recognize and use common irrational numbers*

EIGHTH GRADE

Number Sense/Relationships 2

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop, test, and explain conjectures to estimate and justify the reasonableness of solutions involving real numbers.

Learner Objectives

The learner will . . .

- apply computational methods (including ratio and proportion) to solve problems involving commonly used fractions, decimals, percents, and integers* (example, discount, tax, sale price, unit price) and determine whether the results are reasonable
- estimate and justify the reasonableness of solutions to problems

EIGHTH GRADE

Algebraic Methods

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze functional relationships and convert from one functional relationship to another; analyze geometric and numeric patterns using algebraic notation.

Learner Objectives

The learner will . . .

- recognize and represent the relationships among variables in a variety of ways, including the use of words, tables, graphs, and symbols
- analyze functional relationships to explain how a change in one quantity results in a change in another (example, how a person's height changes over time)
- analyze linear and non-linear functions and contrast their properties from tables, graphs and equations
- analyze and apply a linear function of the form y = mx + b using tables, graphs, and equations

EIGHTH GRADE

Data Collection and Analysis, Statistics and Probability 1

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Use data collection and statistical analysis in problem-solving situations and communicate the reasoning.

Learner Objectives

The learner will . . .

- formulate hypotheses, draw conclusions, and make convincing arguments based on data analysis
- graph a linear data set, determine a line of best fit informally, and draw valid conclusions about the data set

EIGHTH GRADE

Data Collection and Analysis, Statistics and Probability 2

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Make predictions using theoretical probability of compound events in real-world problems.

Learner Objectives

The learner will . . .

- use a model or counting technique to determine all the possible outcomes from an experiment (example, the number of ways students can line up to have their picture taken)
  - combinations
  - permutations
  - fundamental principle or counting principle
  - factorials

EIGHTH GRADE

Geometric Concepts

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Communicate understanding and reasoning of geometric concepts, properties and relationships in problem-solving situations.

Learner Objectives

The learner will . . .

- describe and analyze informally properties (for example, parallelism, perpendicularity, angle relationships, and similarity*) of two- and three-dimensional figures
- solve problems in real-world situations* using coordinate geometry* (for example, maps, distance on a number line)
- solve problems involving surface area and volume* in three dimensions (include right prisms and cylinders)
- apply the Pythagorean Theorem to solve real-world problems*
- perform symmetry transformations of figures, including reflections, translations, and rotations

EIGHTH GRADE

Measurement 1

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Use formulas and/or procedures to solve problems involving measurement.

Learner Objectives

The learner will . . .

- develop and use procedures or formulas to solve problems involving measurement (for example, distance, area, surface area, and volume* of right prisms and cylinders)
- apply Pythagorean Theorem to find distance

EIGHTH GRADE

Measurement 2

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Estimate, determine, and use direct and indirect measurements to describe and make comparisons.

Learner Objectives

The learner will . . .

- estimate and use measures of area, volume*, capacity*, weight, and angle comparisons to solve problems

EIGHTH GRADE

Measurement 3

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Describe how a change in an object's linear dimension affects its surface area and volume.

Learner Objectives

The learner will . . .

- describe how a change in an object's linear dimensions affects its perimeter, area and volume* (for example, how the area of a circle changes as the radius increases)

EIGHTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Apply appropriate computational techniques for use in problem-solving situations.

Learner Objectives

The learner will . . .

- apply order of operations to evaluate expressions with integers*
- express very small and very large numbers in scientific notation

In grades 9-10, computation will be integrated into State Standards 1-5.

NINTH GRADE

Number Sense/Relationships 1

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Utilize real numbers in problem solving situations.

Learner Objectives

The learner will . . .

- estimate and justify reasonableness of answers using both technological and paper and pencil methods
- order, compare and use equivalent representations of real numbers, rational numbers, and integers
- perform operations with rational numbers
- use very large and very small numbers in the context of real life situations (scientific notation and exponents)

NINTH GRADE

Number Sense/Relationships 2

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop and test patterns and conjectures about the real number properties.

Learner Objectives

The learner will . . .

- justify reasonableness of answers using technological and paper and pencil methods
- develop and formulate sequences that represent linear and simple exponential patterns (e.g. perfect squares)

NINTH GRADE

Algebraic Methods 1

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Model real world situations using expressions, functions, equations, inequalities, and linear systems.

Learner Objectives

The learner will . . .

- generate and solve linear equations involving functional relationship using technological and paper and pencil methods
- create and evaluate multi-variable algebraic expression
- draw reasonable conclusions and make predictions about a situation being modeled
- solve linear systems of two variable equations using graphical algebraic methods, and numerical methods

NINTH GRADE

Algebraic Methods 2

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop, use, and describe the connections between multiple representations of relations and functions (verbal, graphical, numerical, and algebraic).

Learner Objectives

The learner will . . .

- represent a mathematical situation using a table, graph, function and an oral or written explanation
- apply and translate among math representations to solve problems
- describe and communicate the connection between the four representations (table, graph, function and explanation) of the mathematical situation

NINTH GRADE

Algebraic Methods 3

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze and explain transformations and general properties of functions algebraically and geometrically.

Learner Objectives

The learner will . . .

- identify the x- and y-intercepts and describe their meaning
- explain and demonstrate algebraically and graphically the effects of the following transformation on a linear function
  - translations (horizontal and vertical)

NINTH GRADE

Algebraic Methods 4

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze rates of change in various contexts and approximate and interpret rates of change from graphical and numerical data.

Learner Objectives

- identify and interpret the slope in a geometric or algebraic context
- use the slope to generate the equation of a line (e.g. y=mx+b, point-slope, slope-intercept)
- use, identify, and interpret the slope in real-life application (e.g. motion, velocity, economic)
- identify and interpret the rate of change from numerical and graphical data and determine the type of function, linear or non-linear, relationships

NINTH GRADE

Data Collection and Analysis, Statistics and Probability 1

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Design and conduct a statistical experiment and interpret and communicate the results using the appropriate technology.

Learner Objectives

The learner will . . .

- use descriptive statistics including measure of central tendency and variability to describe data (results)
- display data using box and whisker, histogram, scatter plot, and stem and leaf plot and determine which method(s) is statistically effective
- analyze data to draw conclusions and make predictions

NINTH GRADE

Data Collection and Analysis, Statistics and Probability 2

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Fit curves to scatter plots, determine the strength of the relationship between two data sets, and make predictions.

Learner Objectives

The learner will . . .

- determine a line of best fit using informal techniques or appropriate technology
- analyze the correlation (positive, negative or non-existent) between two sets of data and communicate the strength of that relationship
- make predictions about the data using lines of best fit

NINTH GRADE

Data Collection and Analysis, Statistics and Probability 3

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Use experimental and theoretical probability to represent and solve real world problems involving uncertainty.

Learner Objectives

The learner will . . .

- determine the probability of an identified event using the sample space
- make predictions using theoretical probability in real-world situations (problems)
- use a model (e.g. list, tree diagram, area model) to determine theoretical probability to solve problems involving uncertainty
- solve real-world problems with informal use of counting techniques

NINTH GRADE

Geometric Concepts 1

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze relationships among properties of geometric figures.

Learner Objectives

The learner will . . .

- investigate and apply angle properties of polygons, including regular polygons
- use coordinate geometry to solve problems involving geometric shapes and their properties

NINTH GRADE

Geometric Concepts 2

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Derive and apply methods of measurement that explore properties of two and three dimensional figures.

Learner Objectives

The learner will . . .

- solve problems involving perimeter and area of regular and irregular geometric shapes
- solve problems involving circumference and area of circles using real world situations

NINTH GRADE

Geometric Concepts 3

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Explore properties and measurements of triangles.

Learner Objectives

The learner will . . .

- use the Pythagorean Theorem to solve real world problems

NINTH GRADE

Measurement 1

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Select and apply appropriate tools and techniques to measure quantities in order to achieve specific degrees of precision, accuracy, and error.

Learner Objectives

The learner will . . .

- determine the units to be used given the desired degree of precision

NINTH GRADE

Measurement 2

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Solve problems involving measurement using algebraic and geometric techniques.

Learner Objectives

The learner will . . .

- determine an effective process for solving measurement problems indirectly

NINTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Computation is integrated into State Standards 1-5.

TENTH GRADE

Number Sense/Relationships 1

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Utilize real numbers in problem solving situations.

Learner Objectives

The learner will . . .

- estimate and justify reasonableness of answers using both technological and paper and pencil methods
- order, compare and use equivalent representations of real numbers
- perform operations with real numbers
- use very large and very small numbers (scientific notation and exponents) in the context of real life situations

TENTH GRADE

Number Sense/Relationships 2

State Standard 1: *Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop and test patterns and conjectures about the properties of real numbers.

Learner Objectives

The learner will . . .

- justify reasonableness of answers using technological and paper and pencil methods
- develop and formulate sequences that represent linear and quadratic patterns

TENTH GRADE

Algebraic Methods 1

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Model real world situations using functions, equations, inequalities, systems, and matrices.

Learner Objectives

The learner will . . .

- generate quadratic functions that model real world situations
- solve problems with equations using technological and paper and pencil methods
- make and justify reasonable conclusions and predictions about a situation being modeled
- solve systems of equations using graphical and algebraic methods and numerical methods including the use of technology

TENTH GRADE

Algebraic Methods 2

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Develop, use, and describe the connections between multiple representations of relations and functions (verbal, graphical, table, numerical, and symbolic).

Learner Objectives

The learner will . . .

- represent a mathematical situation using a table, graph, function and an oral or written explanation
- apply and translate among math representations to solve problems
- describe and communicate the connection between the four representations (table, graph, function and explanation) of the mathematical situation

TENTH GRADE

Algebraic Methods 3

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze and explain transformations and general properties of functions algebraically and geometrically.

Learner Objectives

The learner will . . .

- identify the x- and y-intercepts of functions including quadratics and describe their meaning
- graphically and algebraically find the maxima and minima of a function within a given domain
- explain and demonstrate algebraically and graphically the effects of the following transformations on a function
    - translations (combinations of horizontal and vertical)
    - reflections over the x- and y-axis
    - dilations

TENTH GRADE

Algebraic Methods 4

State Standard 2: *Students use algebraic methods* to explore, model, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze rates of change in various context and approximate and interpret rates of change from graphical and numerical data.

Learner Objectives

The learner will . . .

- use, identify, and interpret the rate of change in real life application (e.g. motion, velocity, economic)
- identify and interpret the rate of change from numerical and graphical data and determine the type of functions that may model their relationships

TENTH GRADE

Data Collection and Analysis, Statistics and Probability 1

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Design and conduct a statistical experiment and interpret and communicate the results using the appropriate technology.

Learner Objectives

The learner will . . .

- understand the characteristics of valid and unbiased data collection and identify factors which may have affected the outcome of a survey
- use descriptive statistics to describe the data (including standard deviation)
- select a statistically effective method to display one- and two-variable data sets
- analyze data to justify and communicate conclusions and predictions
- recognize and explain the misuse of statistical data

TENTH GRADE

Data Collection and Analysis, Statistics and Probability 2

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Fit curves to scatter plots, determine the strength of the relationship between two data sets, and make predictions.

Learner Objectives

The learner will . . .

- determine a line or curve of best fit using informal techniques and appropriate technology
- use curves of best fit to make predictions about the data

TENTH GRADE

Data Collection and Analysis, Statistics and Probability 3

State Standard 3: *Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Use experimental and theoretical probability to represent and solve real world problems involving uncertainty.

Learner Objectives

The learner will . . .

- determine the probability of an identified event using sample space
- make predictions using theoretical probability in real-world situations (problems)
- distinguish between experimental and theoretical probability
- calculate the probability of independent and dependent events in real-world situations
- use a model (list, tree diagram, area model) to determine theoretical probability to solve problems involving uncertainty
- solve real-world problems with informal use of counting techniques (using combinations and permutations)

TENTH GRADE

Geometric Concepts 1

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Analyze relationships among and properties of geometric figures.

Learner Objectives

The learner will . . .

- create and test conjectures about properties of geometric figures using inductive reasoning (parallelism, perpendicularity, similarity, congruency and symmetry)
- create and test conjectures about properties of geometric figures (parallelism, perpendicularity, similarity, congruency and symmetry) using deductive reasoning (e.g. flow-chart, paragraph or two-column proof)
- apply geometric relationships, such as parallelism, perpendicularity, and numerical relationships and properties of polygons to solve problems
- explore relationships among and properties of geometric figures using technology

TENTH GRADE

Geometric Concepts 2

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Derive and apply methods of measurement that explore properties of two-and three-dimensional figures.

Learner Objectives

The learner will . . .

- use properties of geometric shapes to find surface area and volume of regular and irregular figures

TENTH GRADE

Geometric Concepts 3

State Standard 4: *Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.*

Essential Learning

Explore properties and measurements of triangles.

Learner Objectives

The learner will . . .

- informally prove and apply the Pythagorean Theorem to solve real-world problems
- derive and apply properties of special right triangles (45-45-90; 30-60-90)
- understand and apply right triangle trigonometric ratios to real-life situations

TENTH GRADE

Measurement 1

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Select and apply appropriate tools and techniques to measure quantities in order to achieve specific degrees of precision, accuracy, and error.

Learner Objectives

The learner will . . .

- determine the units to be used given the desired degree of precision

TENTH GRADE

Measurement 2

State Standard 5: *Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.*

Essential Learning

Solve problems using algebraic, geometric, and trigonometric techniques.

Learner Objectives

The learner will . . .

- determine an effective process for solving measurement problems indirectly
- use technological tools to evaluate and explain how changing one attribute of a geometric figure impacts the properties of that figure

TENTH GRADE

Computational Techniques

State Standard 6: *Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.*

Computation is integrated into State Standards 1-5.

ELEMENTARY MATHEMATICS MATERIALS
Recommended

K-5 Materials

Everyday Mathematics, SRA/McGraw-Hill, University of Chicago School Mathematics Project, 2004
Grades K-6

ELEMENTARY MATHEMATICS SUPPLEMENTAL MATERIALS
Recommended

K-5 Supplemental Materials

Ground works, Wright Group/McGraw Hill*,* 2006
Grades 1-6

Problem Solver I and II, Creative Publications*,* 2004
Grades 1-5

Nimble with Numbers, Dale Seymour Publications, 1999
Grades 1-6

Developing Number Concepts, Dale Seymour, 1999

Everyday Counts Calendar Math, Great Source Education Group, 1999

Mental Math in the Primary Grades, Dale Seymour*,* 1998

*The Mad Minute (*basic facts practice*)*, *Shoecraft, Paul and Clukey, Terry* 1981

Everyday Math Teacher's Assessment Assistant CD, SRA/McGraw Hill, 2004

SECONDARY MATHEMATICS MATERIALS
Recommended

Grades 6-8 Materials

Connected Mathematics Project 2, Prentice Hall*,* 2006

Grades 9-10 Materials

Interactive Mathematics Program, Key Curriculum Press, 2004

Mathematics Algebra 1, Geometry, and Algebra 2, Pearson Prentice Hall, 2007

Contemporary Mathematics in Context, (Core Plus)*,* Glencoe McGraw Hill, 2003

Algebra 1, Geometry, and Algebra 2, McDougall Littell, 2007

ADDITIONAL SECONDARY MATHEMATICS MATERIALS
Approved

Trigonometry, Addison Wesley, 2005

Intermediate Algebra-Graphs and Functions. Houghton Mifflin, 2003

Pre-Algebra. McDougal Littell, 2008

Mathematics in Action Algebraic, Graphic and Trigonometric Problem Solving, Pearson, 2010

SECONDARY MATHEMATICS SUPPEMENTAL MATERIALS
Recommended

Secondary Supplemental Materials

Navigating through Algebra, Geometry, and Measurement, National Council of Teachers of Mathematics, 2003

Navigation Series, National Council of Teachers of Mathematics, 2003

Quick Review, Glencoe McGraw Hill, 2004

Connected Mathematics Project (two units from first edition), Prentice Hall, 2004

Pizzazz, Books A thru E, Wright Group McGraw Hill, 1989

Pre-Algebra with Pizzazz, Wright Group McGraw Hill, 2002

Algebra with Pizzazz, Wright Group McGraw Hill 2002